DOCUMENT RESUME

ED 392 374 HE 028 974

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TITLE	Undergraduate Debt and Participation in Graduate Education: The Relationship between Educational Debt and Graduate School Aspirations, Applications, and Attendance among Students with a Pattern of Full-Time, Continuous Postsecondary Education.
INSTITUTION	Educational Testing Service, Princeton, N.J.; Graduate Record Examinations Board, Princeton, N.J.
REPORT NO	ETS-RR-89-45; GREB-RR-86-05R
PUB DATE	Jun 91
NOTE	41p.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Academic Aspiration; Academic Persistence; *College Graduates; College Students; Educational Trends; Enrollment; *Graduate Study; Higher Education; Student Loan Programs
IDENTIFIERS	*Debt (Financial); High School and Beyond (NCES); National Longitudinal Study High School Class 1972

ABSTRACT

This study explored the relationship between undergraduate educational loan indebtedness and graduate school aspirations, application, enrollment, and persistence, using data from the National Longitudinal Study of 1972 and from the 1980 and 1982 cohorts of the High School and Beyond study. The analysis was limited to full-time students who did not interrupt their postsecondary education. The results show that aspirations and application for graduate education were slightly higher for indebted than non-indebted college seniors in 1976 and 1984 and essentially equal for these two groups in 1986. Slightly more college graduates with educational debt than without enrolled in graduate or professional school in 1976 and 1984. Regression analysis showed little unique contribution of debt level to graduate aspirations, application, enrollment, and persistence after controlling for factors such as background and differences in undergraduate educational experience. The report is illustrated with 15 tables and 1 figure. (Contains 23 references.) (Author)

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HE028974

June 1991

GRE Board Research Report No. 86-05R
ETS Research Report 89-45

Educational Testing Service, Princeton, New Jersey

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June 1991

This report presents the findings of a research project funded by and carried out under the auspices of the Graduate Record Examinations Board.

Educational Testing Service, Princeton, N.J. 08541

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Abstract

This study explored the relationship between undergraduate educational loan indebtedness and graduate school aspirations, application, enrollment, and persistence, using data from the National Longitudinal Study of 1972 and from the 1980 and 1982 cohorts of High School and Beyond. The analysis was limited to full-time students who did not interrupt their postsecondary education. The results show that aspirations and application for graduate education were slightly higher for indebted than non-indebted college seniors in 1976 and 1984 and essentially equal for these two groups in 1986. Slightly more college graduates with educational debt than without enrolled in graduate or professional school in 1976 and 1984. Regression analyses showed little unique contribution of debt level to graduate aspirations, application, enrollment and persistence after controlling for factors such as background and differences in undergraduate educational experience.

Undergraduate Debt and Participation in Graduate Education:

The Relationship Between Educational Debt and Graduate School Aspirations, Applications, and Attendance Among Students with a Pattern of Full-Time, Continuous Postsecondary Education

Many students borrow money for their undergraduate education. In fact, student borrowing to pay the costs of undergraduate education has quintupled during the last decade. Hansen (1986) notes that, although loans were originally conceived of as a convenience for the middle class, they have now become an important financing tool for students from all income levels. She states, "This transformation, however, has occurred with relatively little attention paid to the impact of borrowing for education on students who have to repay these loans" (p.i).

The extent to which the accumulation of educational debt influences students in their postsecondary educational and occupational choices is not clear. Some students may leave college because of debt and others may decide not to enroll in graduate or professional school. Another possibility is that students with high debt levels may seek careers in business and other high-paying occupations rather than enter graduate school and pursue careers in academe. It seems likely that the effects of changes in the financing of undergraduate education will be particularly strong in graduate education, where there has been a corresponding decrease in fellowships and an increase in student reliance on assistantships, loans, and self-support (Smith, 1985).

The purpose of this research is to examine the relationship between undergraduate loan indebtedness and the decision to pursue education in graduate and professional schools for students who completed college four years after completing high school and who did or did not enter graduate or professional education immediately after completing college. These "on-track" students are probably the most highly motivated and academically able group of participants in postsecondary education. However, they do not represent the entire population of undergraduate and graduate students. Therefore, it is important not to overgeneralize the findings of this study.

The research focuses on three questions:

- What relationship (if any) does undergraduate educational loan indebtedness have with aspirations for, application to, enrollment in, and persistence in graduate or professional school?

- Do these relationships differ for males and females, students of differing socioeconomic status, or minority and White students?

- Do these relationships differ for students who enter graduate school and those who enter professional school?

Previous Research

Little research has focused specifically on the relationship between college finances and postgraduate education decisions; much of what research exists predates the widespread use of educational loans that was prevalent in the 1980s. Most of the existing research suggests that undergraduate educational debt does not have a negative effect on graduate education plans and participation. In a survey of 21,000 college graduates in 1971, Baird (1973) found that "the amount students had borrowed as undergraduates and the amounts remaining to be paid were very similar for students who planned to continue their education and those who did not." (p. 73) A more extensive analysis, using the National Longitudinal Study of 1972 (Sanford, 1979) concluded, "contrary to the hypothesized relationship, loans and grants are positively related to attending graduate or professional school. These relationships hold with controls for SES and GPA." (p. 21)

However, students often cite financial factors as affecting their plans for graduate education. In a study of 1961 college graduates, Davis (1964) found that "perceived financial obstacles" limited the pursuit of advanced degrees, especially among students of lower socioeconomic status.

A survey of 4,000 individuals who were seniors in eight colleges and universities in 1982 (Consortium on Financing Higher Education, 1983) indicated that although two-thirds had entertained thoughts of attending graduate school, only 15% planned to enroll the following fall. Financial reasons appeared to play a minor, but not insignificant, role in graduate school decisions. For example, 12% of the students who had considered graduate school but eventually decided against it reported that the major reason for this decision was high educational debts; another 15% said that they were deterred by the uncertain future of financial aid programs, and 22% said that graduate school was too expensive even with aid.

More is known about the characteristics of students who receive financial aid. Analysis of the postsecondary careers of students who were high school seniors in 1980 indicated that approximately 63% of these students entered some type of postsecondary education by 1982 and that approximately 43% of the students in postsecondary education received some form of financial aid. Approximately 30% of the students had loans. The likelihood of a loan increased as tuition increased. Data collected from these same students in 1984 indicated that loans were most likely to be used by middle-income students enrolled in high tuition institutions. (National Center for Education, 1984).

An analysis by Maxwell and Corrallo (1984), using data from the 1982 Cooperative Institutional Research Program Survey of first-time freshmen, showed that the <u>size</u> of the loan was related to family income. Students from families with incomes below $25,000 received more loan assistance than students from families with higher incomes; students from families with incomes between $25,000 and $40,000 received more loan assistance than students whose family income exceeded $40,000.

Research has also shown a positive relationship between the receipt of undergraduate financial aid and completion of an undergraduate education (Astin, 1975; Carroll, 1987, Jensen, 1981; Terkla, 1984). St. John, Kirshstein, and Noell (1988) concluded that loans, as well as grants and work-study, were effective in promoting student persistence in college.

Nettles (1988) found no significant differences in the current size of unpaid undergraduate loans among Black, Hispanic, and White students enrolled in doctoral programs at four universities. Slightly more than half of these doctoral students reported no debt at the end of their undergraduate education. The total mean undergraduate debt amounts for students in these groups with loans ranged from $5,283 to $5,920. The amount of undergraduate educational debt was negatively related to the amount of time students took off between undergraduate and graduate education. Students who had undergraduate debts were more likely to receive graduate fellowships or assistantships and were more likely to attend graduate school full time.

A recent study by the National Research Council has concluded that Ph.D. graduates are not "hopelessly encumbered with debt" (Thurgood, 1989). About half of all 1987-88 Ph.Ds owed no money for their education. The median debt for those who had borrowed was $7,471.

Conceptual Framework and Methodology

This study can be viewed as a part of the much larger body of research examining the effects of college on students (e.g., Astin, 1977; Bowen, 1977) and, within this research, those studies examining the determinants of educational attainment (e.g., Wolfle, 1985) and the relationship between financial aid and educational persistence.

Models of the factors affecting higher education aspirations typically include student background, secondary school achievement, college achievement, and college environment (e.g., Pascarella, 1984). Models of the relationship between financial aid and educational persistence typically include student background, ability, educational aspirations, college attributes, and financial aid characteristics (e.g., St. John, Kirshstein, & Noell, 1988). The conceptual model used in this study has similarities to both of these groups of models.

Figure 1 (see Appendix A) shows our overall conceptual model. The major components related to application to graduate or professional school are the student's background (sex, race/ethnicity, marital status, family income, and parental level of education); high school achievement (as measured by grade-point average and the composite score on the National Longitudinal Study or High School and Beyond achievement tests); and college factors (including the student's grade-point average, major field, tuition and fees, and amount of educational debt accumulated by the end of college). These factors are conceptualized as affecting graduate education aspirations at the end of college. These, in turn, affect enrollment in graduate school, and, along with the availability of graduate financial aid, graduate school enrollment and persistence.

There are four outcome variables being analyzed: (1) graduate educational aspirations at the end of college, (2) graduate education application, (3) graduate enrollment, and (4) persistence in graduate education. These outcome variables are assumed to have an a-priori causal ordering according to the above sequence. These four outcomes generate four regression equations, with educational aspirations included in the prediction of graduate education application as well as the background, high school and college variables. Graduate educational aspirations were not included in the enrollment or persistence analyses since the subjects had been accepted by or were in graduate school. Graduate financial aid is added in these last two analyses.

While the conceptual model describes a causal chain we are making no claims as to whether the present study can serve as a validation of the particular causal structure posed in Figure 1. This study can be best depicted as an exploratory study describing the relationship between an ordered set of policy relevant variables and selected explanatory variables. While we feel that the ordering of the outcome variables is consistent with a causal model based on both time sequence and logical considerations, we are purposely avoiding much of the value-laden vocabulary that accompanies most path analytic structures. In this vein we have decided to present only the direct effects (partial regression coefficients) and not carry out a formal analysis of the indirect effects.

The model does not include two components that may have a significant bearing on student behavior regarding debt and graduate education. These components are (1) students' attitudes about the desirability of borrowing to finance their education and (2) the economic climate that prevailed when the students were making decisions about borrowing for college and about entering graduate education. Factors such as the availability of loans, interest rates, and the job market conditions in a variety of fields and locations may have had a considerable influence on the decisions of some students.

The decision to pursue or not pursue graduate education is clearly affected by many factors. As students proceed through high school and college, they receive feedback in the form of course grades and faculty interest that may confirm or modify career goals. Job market conditions may affect plans for further study. In times of high unemployment, obtaining further education may seem a wise and attractive option. But when job opportunities are plentiful and salaries high, students may be tempted to cancel or postpone plans to obtain advanced degrees. Marriage and family formation may limit an individual's freedom to pursue further education. And a variety of financial considerations undoubtedly play an important part in this decision--for example, the anticipated balance between the cost of graduate school and the expected increase in earnings that would accrue; the family's ability and willingness to contribute to the student's continuing educational expenses, as well as ingrained family attitudes about the appropriateness of borrowing money for education; and, of course, the level of debt, if any, incurred in the undergraduate years.

Modeling the graduate school decision is made extremely difficult by the complexity of these considerations. In some cases, recursive factors may be at work. The relationship between college costs and the structure of financial aid packages also contributes to the difficulty of studying the contribution of debt to the graduate school decision. Within a particular college, students from middle-income families may incur the highest debts, and students from the most- and least-prosperous backgrounds may borrow relatively little, the former because parents can afford to pay the bills and the latter because the college may weight financial aid packages for low income students heavily in favor of grants over loans. Other students who are particularly able relative to the college's overall level of selectivity may be offered financial incentives to attend regardless of their families' abilities to pay.

When students are compared across colleges, as in this study, the situation becomes even more ambiguous. A student of moderately high ability and aspirations might be an academic star at a relatively nonselective college and might receive grants to cover all expenses as well as positive reinforcement of any graduate school plans. If the same student chooses to attend a very selective and expensive private college instead, he or she may incur large debts and, not measuring up to the accomplishments of more able classmates, be discouraged from pursuing graduate education. The very same student, again, might enroll in a public university where loans might not be needed because of relatively low costs.

Further complicating the relationship of graduate attendance with background and financial factors is field of study. Some fields, such as law or medicine, require graduate education, but in others, such as business, graduate education may be the exception rather than the rule. Although there may be considerable confounding of major field with financial status, career objectives (and the amount of education required to obtain them) can realistically be expected to be an overriding consideration in educational plans.

The analysis presented here consists of two parts: (1) a descriptive analysis showing the graduate education aspirations, applications, and enrollment of students with and without educational debt and (2) regression analyses to examine the relationships between major variables in the conceptual model, including debt amount, and graduate education aspirations, graduate education application, and graduate/professional school enrollment, and persistence in graduate education.

The four different regressions are based on two different groups: 1) college graduates (college seniors in 1986), for the analysis of educational aspirations at the end of college and application to graduate/professional school, and 2) those seniors who had applied to and been accepted by graduate or professional schools for enrollment and persistence.

Analyses were conducted separately for three student cohorts: (1) the National Longitudinal Study of 1972 (NLS-72) high school seniors,

(2) the High School and Beyond (HS&B) 1980 senior cohort, and (3) the HS&B 1980 sophomore cohort. The first cohort consists of individuals who were high school seniors in 1972 and who completed college by 1976. The second cohort consists of students who were high school seniors in 1980 and who completed college by 1984. The third cohort consists of individuals who were high school seniors in 1982 and college seniors or graduates in the spring of 1986, the latest time for which data are currently available. (Another round of data collection occurred in the spring of 1988 but it will take a year or more before these data are available for analysis.) Detailed information about NLS-72 can be found in Riccobono et al. (1981); detailed information about HS&B can be found in Frankel et al. (1981).

For all three cohorts, data were obtained from questionnaires that were first administered to the students (sampling first by high school characteristics and then by students within high schools) when they were high school seniors, with follow-ups at intervals of approximately every two years after this initial contact. These questionnaires provide information about student background, educational attainment and aspirations, and financing of undergraduate education. Oversampling was done to ensure adequate representation of minority students. The first two cohorts were weighted to be representative of all students who were seniors in high school in 1972 and 1980. The third cohort was weighted to be representative of high school sophomores in 1980.

As indicated earlier, these samples are restricted to individuals who completed college no later than four years after completing high school. This was done, in part, because previous research had shown no negative relationship between debt and undergraduate educational persistence. It also allowed us to eliminate from our sample those "on again, off again" students who are difficult to track.

However, excluding students with delayed entry, stopout, dropout, or part-time enrollment restricts this sample considerably. Among the two-thirds of all 1982 high school seniors who had some record of postsecondary education by 1986, only 22 percent entered college immediately after high school and had continuous, full-time enrollment through 1986. These students were more likely to be from higher socioeconomic status families and were more likely to come from Asian-American or White racial-ethnic backgrounds than students who delayed entrance.

The data bases used have some limitations for the purposes of this study. Although sample sizes of 20,000 to 30,000 are adequate for studies involving the entire age cohort, the focus here is only on those who completed college in four years and, even more narrowly, on those who aspired to, applied to, or enrolled in graduate or professional education. For some analyses, this reduces the sample of interest to a few hundred individuals. When the sample is further divided by gender or race/ethnicity, only rough approximations of national estimates can be made.

Another limitation involves the variables available in the data bases. There are single-item measures of educational and occupational

aspirations, but these may not fully describe variations in the extent of ambition or depth of commitment to plans that contribute to the educational choices students make. Long-term goals certainly contribute to students' choice of college (and the attendant expense) and their willingness to go into debt, as much as undergraduate debt contributes to later re-thinking of plans for the future. Because we do not have random assignment of debt level "treatments" (as in any observational study), caution must be used in attributing causality to relational findings. In addition, when we look at the distinction between graduate and professional school, one cannot distinguish between types and levels (e.g., terminal master's vs. doctorate). Finally, there is a lack of items that would help us infer students' feelings about debt and their sensitivity to changes in the economy and in the job market. For example, there is no item common to the three data sets that provides information about students' willingness to enter into debt for their education. As indicated earlier, students who are less willing to borrow may become part-time students or delay enrollment in college or graduate school.

Findings

Descriptive Analysis

The descriptive analyses reported in this section provide comparisons of participation in undergraduate education, extent of undergraduate educational debt, graduate education aspirations, and graduate/professional application rates across all three cohorts. These analyses also compare graduate/professional school enrollment rates for the 1976 and 1984 college graduates.

Undergraduate educational debt. The percentage of college graduates with educational loans and the average debt increased from 1976 to 1984 (see Table 1 in Appendix B). In 1976, 38% of the college graduates indicated that they had educational debt; the mean debt was $2,710. By 1984, 59% of college graduates reported having an educational debt; the mean debt was $5,967 (equivalent to $3,306 in 1976 dollars, a 22% increase in real dollars)[1]. The incidence of education debt appears to have declined between 1984 and 1986, but the average debt level increased slightly. In 1986, 48% of college seniors had educational debts, and the average debt level was $6,615 ($3,486 in 1976 dollars).

The higher proportion of indebted college seniors in the 1980s is probably related to the national shift in college funding from grants to loans. In 1975-76, about 75% of federal student aid was in the form of grants and about 21% in the form of loans. By 1984-85, 61% of student aid was in loans and 34% in grants. The growth in loans was primarily in the Guaranteed Student Loan program, which served fewer than one million students in 1975-76 but reached 3.4 million in 1984-85. The average size

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[1]The dollar adjustment was based on the Consumer Price Index information Table 17-38 in Social Security Bulletin, June 1986, Vol. 49, No. 6, page 66. The ratio of all items in 1984 to all items in 1976 was used.

of the loans made under this program also increased, from $1,310 in 1975-76 to $2,326 in 1984-85 (The Condition of Education, 1986).

What are the characteristics of students with and without educational debt? Some of the background (sex, race/ethnicity, and socioeconomic[1]) differences associated with debt among 1976, 1984, and 1986 college graduates are shown in Table 2.

In 1976, minority students and students from low socioeconomic status (SES) families were most likely to have educational debts by their senior year in college; approximately 60% of such students were indebted. The highest levels of debt were found among middle SES and minority students. These debts averaged approximately $2,900. In 1984, the incidence of indebtedness increased across all socioeconomic groups. Whereas students from lower SES families were still the most likely to have educational debts, the proportion of high-SES students with debt more than doubled. The proportion of White students with debt also increased substantially, but the proportion of indebted minority students remained about the same. As a result, both groups had similar rates of indebtedness. The highest debt levels were found among White and high-SES students. The proportion of indebted graduating seniors seems to have decreased between 1984 and 1986 across most of the subpopulations, but most dramatically among high-SES students.

Graduate education aspirations. Among the students who completed (or were seniors in) college, aspirations for graduate education ran high. However, these aspirations declined between 1976 and 1986 (see Table 3). More than three quarters of 1976 college graduates indicated that they wished to attend graduate or professional school, compared to 54% of 1984 college graduates and 62% of 1986 college seniors.

In 1976 and 1984, more seniors with debts aspired to graduate education than seniors without debts. In 1976, 82% of seniors with debt aspired to graduate education, compared to 73% of seniors without debt. In 1984, 55% of seniors with debt, as compared to 51% of seniors without debt, aspired to graduate education. However, by 1986 debt was no longer associated with aspirations for graduate education.

Graduate/professional school applications. Analysis of trends in graduate/professional school application rates shown in Table 4 is complicated by cohort differences in the time of data collection. The application data for the 1976 college seniors were obtained in the fall following their graduation from college. These data showed that 32% of

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[1]In the descriptive portion of this study, we used a composite variable based on parental education, income, occupation and articles in the home to define socioeconmic level. This variable, which was defined when the students were high school seniors, is divided into quartiles. The students were classified in three socioeconomic groups--the lowest quartile, the middle two quartiles, and the highest quartile. In the relational analysis we use family income and parents' education as separate variables in lieu of socioeconomic status because we hypothesized they might have different effects.

these students had applied to attend graduate or professional schools. Data on graduate school applications were available at two points for the 1984 college seniors; the first information, collected in February 1984 (their senior year in college), showed that 13% of the seniors had made graduate school applications by that time. The second set of data on graduate school applications by the 1984 seniors was obtained in February 1986; this showed that 25% had applied to graduate or professional schools. Data on graduate school applications made by 1986 college seniors were also collected in February 1986. They show that 13% of these seniors had made applications by that date, a percentage similar to the application rate for 1984 college seniors. We conclude, therefore, that graduate education application rates declined considerably between 1976 and 1984 and then leveled off in the mid-1980s.

We used two measures to examine the possible impact of education debt on graduate/professional school application rates. First, we compared the propensity of graduates with and without debt to apply to graduate/professional school. Second, we compared the relative debt levels of indebted graduates who chose to apply or not apply to graduate/professional school.

In 1976 and 1984, college graduates with educational debts were somewhat more likely to apply to graduate or professional schools than graduates without such debts (see Table 4).

Applicant rates for college graduates grouped by debt status and background characteristics are shown in Table 5. In 1976, across all categories, students with debt were more likely to apply to graduate/professional school than students without debt. This pattern persisted in 1984 for females, but not for males and for middle and high SES students, but not for low SES graduates. By 1986 application rates for indebted versus nonindebted students were very similar for all subgroups.

Table 6 compares debt levels for indebted students who did and did not apply to graduate and professional school. In 1976, applicants to graduate/professional school in nearly every subgroup had higher average debts than nonapplicants. In 1984 and 1986, applicants had slightly lower debt levels, overall, but differences appear across the subpopulations. For example, male applicants had a lower average debt than male nonapplicants; the opposite was true for females. Applicants from low-SES families had considerably lower debt levels than nonapplicants.

The NLS and HS&B data files indicate that almost all the students who applied to graduate or professional schools were accepted at one or more of the schools to which they applied. Therefore, we look next at the enrollment decision.

Graduate and professional school enrollments. Actual rates of enrollment in graduate and professional schools fell between 1976 and 1984 (Table 7). In 1976, 21% of college graduates went on to graduate education immediately after college. In 1984, 11% of graduates did so. In both years, however, students with educational debts were more likely to enroll in graduate education than students without debt. In 1976, 25%

of graduates with debt (average debt of $2,906) entered graduate or professional school, compared to 19% of graduates without debt. In 1984, 12% of graduates with debt (mean debt $5,966, $3,144 in 1976 dollars) went on to graduate education compared to 9% of graduates without debt.

Table 8 shows the relative debt status, separately, for graduates who enrolled in graduate and in professional schools. As noted at the beginning of this paper, policymakers have hypothesized that students with educational debt may be more likely to enroll in professional schools as professions are higher paying than academic occupations. Our data show that in 1976 indebted college graduates were not more likely to enroll in professional school than graduate school. While 28% of the graduates without debt attended professional school, only 23% of the indebted graduates chose this option. Sixty-four percent of indebted students enrolled in graduate schools, compared to 57% of non-indebted individuals. By 1984, however, the picture had changed. Thirty-nine percent of graduates with debt enrolled in professional school compared to 29% of graduates without debt. Sixty-one percent of indebted students enrolled in graduate school compared to 71% of students without debt. Thus, these data tend to support the hypothesis that students with higher debt levels are more likely to enter professional than graduate school.

Persistence. Finally, we looked at persistence in graduate education for students who completed college in 1976 and in 1984. We hypothesized that indebted students might be more likely to drop out of graduate or professional school than students without debt, especially if they had problems obtaining graduate financial aid. For the 1976 graduates, persistence was defined as having completed a graduate or professional degree by fall 1979 or as still being enrolled in graduate/professional school. For the 1984 graduates, persistence was defined as having completed a degree or still being enrolled in graduate/professional school in the spring of 1986. Because of changes in questionnaire content between 1979 and 1986, there were some problems in identifying persisters in 1986. The persistence analysis for the 1984 college graduates is restricted to those students who indicated they were in degree programs in graduate or professional schools; students taking graduate courses only to obtain certificates or licenses (such as teachers) were omitted. Also omitted were students whose graduate school attendance was restricted to summers. Approximately 77% of the students who entered graduate education in 1976 could be defined as persisters in the fall of 1979. Approximately 88% of the students who entered graduate education in the fall of 1984 could be defined as persisters in the spring of 1986. In neither group of students did the descriptive data suggest a relationship between debt and persistence.

Summary. These descriptive data suggest that educational debt did not have a negative relationship with graduate education aspirations, applications, enrollment and persistence for students who completed college in 1976 and 1984. Such findings are consistent with human capital models if students view the additional education, despite the accumulation of debt, as increasing their earning opportunities for the future. However, since educational debt may be correlated with other student characteristics that are positively related to graduate

education, relational analyses are needed to examine whether or not debt has any unique influence on students.

Regression Analysis

Because of the complex interrelationships among the variables in this study, we used regression analysis to determine the unique relationship of each of several key variables. The major variables in this analysis are shown in the conceptual model (Figure 1). The analysis focuses on the relationship of educational debt and other key variables with the graduate education aspirations and applications of students in all three cohorts. It also looks at the unique relationships of these variables with graduate and professional school enrollment of students who completed college in 1976 and in 1984.

Aspirations for graduate education. College grades have a strong, positive relationship with educational aspirations in all three cohorts (See Table 9). This is hardly surprising. The most able students, successful in their education, are most likely to want to continue their education. The less academically successful are eager to move on to another arena.

In all three cohorts we see that minority college graduates are more likely to aspire to graduate and professional education than White college graduates. Tested achievement also shows a consistent and significant relationship with educational aspirations. In two of the three cohorts, we find that having parents with a high level of education and being a science major are also significantly related to having graduate/professional school aspirations.

College costs are positively and significantly related to educational aspirations for college graduates of the 1980s, suggesting that students who plan to attend graduate or professional school tend to attend more expensive (and probably more selective) undergraduate schools.

We see evidence of a significant relationship between amount of educational debt and educational aspirations only in 1976 and it is a positive relationship.

Graduate education application. Students who apply to enter graduate or professional schools immediately upon graduation are those who have high educational aspirations and high grades (Table 10). They also tend to be males and science majors. Minority college graduates were more likely than whites to make graduate education applications in 1976 but, in the 1980s, we see no significant relationship between applications and race. In the 1980s, level of parental education becomes more strongly related to students' graduate applications and, for 1986 college graduates, college costs are positively related to graduate/professional school application. The amount of educational debt shows no significant relationship to graduate and professional school application in any of the three cohorts.

Graduate education enrollment. The enrollment analysis is restricted to those students accepted by a graduate or professional school. The regressions explain relatively little of the variance. The only consistent significant relationship with enrollment in graduate or professional school was marriage, which had a negative effect (see Table 11). For the 1984 college graduates, receipt of financial assistance for graduate/professional education had a significant positive effect. For 1976 graduates, applying for, but not receiving, financial assistance for graduate/professional school had a significant negative effect. It should be noted that educational aspirations are not included in this analysis, or the analysis of persistence, since they become meaningless when all subjects have been accepted by a graduate or professional school.

Graduate education persistence. Most students who entered graduate education persisted until the time of the next follow-up two years later. Table 12 shows regression analyses indicating the relationship between major variables and persistence for the 1976 and 1984 college graduates. As can be seen, the major determiners of persistence in graduate education for 1976 college graduates were being male, having high undergraduate grades, receiving financial aid for graduate education, and coming from a family with high income. Undergraduate educational debt had no unique relationship with persistence for this group of students. No variables showed a significant relationship with persistence for the 1984 college graduates. As for enrollment, the percent of variance accounted for is very low.

These four regression analyses answer the first of our two research questions. To answer the second question, we carried out similar analyses by sex and by race/ethnicity. We also contrasted enrollment for students entering professional versus graduate school.

Does the influence of indebtedness differ by student characteristics? The regression coefficients showing the relationship of debt to the graduate/professional school aspirations, applications, enrollment and persistence for Whites and minorities (Blacks and Hispanics) and for males and females are summarized in Tables 13 and 14. Debt does not show a consistent and significant relationship with these outcomes for any subgroup. However, the minority sample is small so these findings should be treated with caution.

Do enrollment factors differ for students entering graduate school and those entering professional school? Some scholars have suggested that indebted students are more likely to enroll in professional school than graduate school because of the higher expected income (and ability to repay a loan) in the professions. To investigate whether this hypothesis holds, we contrasted enrollment in professional versus graduate school. (See Table 15). The major factor differentiating between professional and graduate school enrollment was sex, with males much more likely to enter professional school than females. For 1976 graduates, college grades also were significant differentiators of enrollment in professional, rather than graduate, school; students with higher grades were more likely to attend professional school. The same regression coefficient for the 1984 graduates just misses statistical

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significance. In 1984, being a science major had a significant negative relationship with professional school attendance.

In 1976, receiving graduate/professional school financial aid was significantly and negatively related to professional school attendance. This may be because aid was not as readily available for professional school students or because those who received aid attended graduate school. Undergraduate educational debt showed a positive, but not significant, relationship with professional school enrollment in both cohorts.

Discussion and Conclusions

This study was designed to address three questions: (1) What relationship (if any) does undergraduate educational loan indebtedness have with aspirations for, application to, enrollment and persistence in graduate or professional school?, (2) Does indebtedness have different effects for Whites and minorities or for males and females?, and (3) Does debt play a significant role in determining whether students enroll in graduate or professional education?

The evidence indicates that having an undergraduate educational debt does not appear to limit college students' aspirations for graduate or professional school. Students with debt were significantly more likely to aspire to graduate or professional education in 1976.

The amount of undergraduate educational debt does not appear to be a major influence on application to graduate or professional school. While the descriptive analysis shows higher application rates among indebted students in the 1970's, debt is not significant in the regression analysis.

Debt level also had no significant relationship with graduate/professional school enrollments. This outcome was much more strongly related to receipt (or non-receipt) of graduate financial aid. Neither did debt appear to be related to persistence in graduate education.

Debt does not appear to have differential relationships by gender. The minority sample size is too small to reach a firm decision for this population but no differential relationship is evident. Neither is debt significant in the decision to enter professional rather than graduate school.

Although it would be tempting to conclude from this analysis that having undergraduate educational debt does not decrease students' aspirations for graduate education or applications to graduate and professional school, we are hesitant to make such a sweeping statement for two major reasons.

First, these data do <u>not</u> represent all college graduates. They represent only those students who remain "on track", going directly from high school to college and then to graduate education; the data are also restricted to those who attend college full-time.

Second, we have not been able to explore whether debt has different effects for students in different types and levels of graduate education. In 1980 approximately 23% of all graduate students were not enrolled in a degree program and approximately 38% of graduate students attended on a part time basis (Occupational Outlook Quarterly, 1984). Debt may be less of an obstacle for students taking only one or two graduate courses, or seeking a master's degree, than for students who are facing the longer road to the doctorate. More recently, Nettles (1988) found 42% of White doctoral students, 50% of Black doctoral students, and 26% of Hispanic doctoral students enrolled on a part-time basis. Debt may also be more of a problem for students who attend graduate school on a full-time basis, than for part-time students, especially those part-time students whose graduate education is being paid for by an employer, or those part-time graduate students who have been assured by employers that completion of a graduate program will bring an increase in wages. However, Nettles found that students with undergraduate debt were less likely to take time off between undergraduate and graduate school and that students with debt are more likely to attend graduate school full-time.

For the present, we conclude that undergraduate educational debt does not appear to have a negative relationship with participation in graduate education for students who remain on track throughout college.

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APPENDIX A

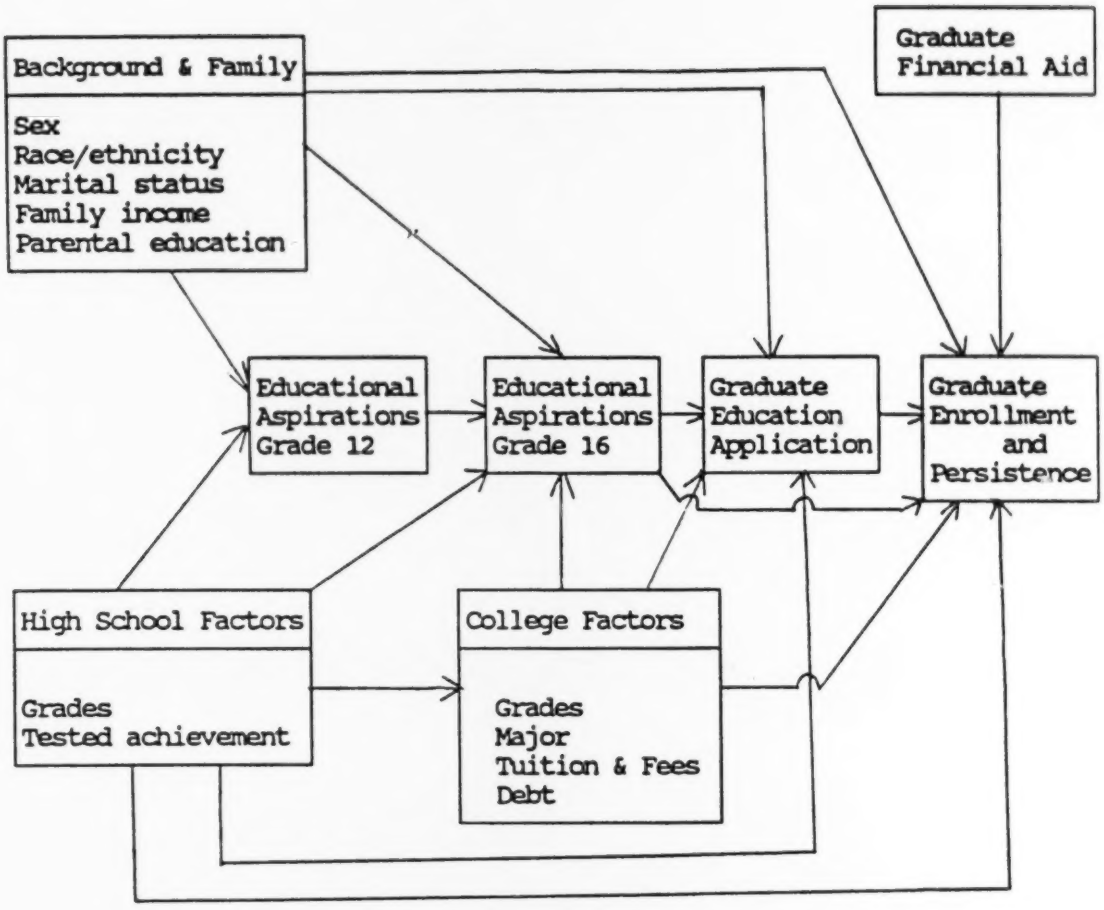

Figure 1

Conceptual Model—Factors Affecting Graduate School, Aspirations, Application, Enrollment, and Persistence

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APPENDIX B

Table 1

Indebtedness of College Graduates in 1976 and 1984
and College Seniors in 1986

	1976	1984	1986
Weight Sample N's*	2,000	1,716	1,612
Percentage with debt	38.4%	59.4%	48.2%+
Mean debt:			
Actual dollars	$2,710	$5,967	$6,615
1976 dollars	$2,710	$3,306	$3,486

+Percentage of 1986 college seniors who reported educational debt as of February 1986.

*Definition of "weighted sample n": Means and percentages were computed using sample weights representative of the national population. In order not to misrepresent the actual number of cases in the study, these weighted numbers were deflated by a common scale factor within each cohort, bringing the reported "total group" down to the number of actual cases used. The "weighted sample n," therefore retains the proportionality of population estimates as well as reporting actual cases. Because minorities were oversampled, however, the "weighted sample n" for Blacks and Hispanics is an underestimate of the number of cases used to compute the statistics.

Table 2

Characteristics of College Graduates in 1976 and 1984
and College Seniors in 1986 With and Without Educational Debts

	With Debt			Without Debt	
	Wtd. Sample N	% All/Grads Seniors	Mean Debt	Wtd. Sample N	% All/Grads Seniors
1976 College Graduates					
Total Group	768	38.4	$2,710	1,232	61.6
Sex:					
Male	351	37.2	$2,661	593	62.8
Female	417	39.5	$2,751	639	60.5
Race/Ethnicity:					
White	653	36.7	$2,712	1,128	63.6
Black	74	63.2	$2,869	43	36.8
Hispanic	13	59.1	$2,985	9	40.9
SES Quartile(s)					
Lowest	115	59.9	$2,623	77	40.1
Middle Two	375	46.9	$2,922	424	53.1
Highest	278	27.2	$2,461	743	72.8
1984 College Graduates					
Total Group	1,019	59.4	$5,967	697	40.6
Sex:					
Male	464	56.6	$6,077	356	43.4
Female	555	61.9	$5,876	341	38.1
Race/Ethnicity:					
White	907	59.8	$6,141	609	40.2
Black	69	61.6	$4,244	43	38.4
Hispanic	22	51.2	$5,387	21	48.8
SES Quartile(s):					
Lowest	109	69.9	$4,359	47	30.1
Middle Two	448	63.1	$5,841	262	36.9
Highest	461	55.0	$6,477	377	45.0

Table 2 (cont'd)

Characteristics of College Graduates in 1976 and 1984
and College Seniors in 1986 With and Without Educational Debts

	With Debt			Without Debt	
	Wtd. Sample N	% All Grads Seniors	Mean Debt	Wtd. Sample N	% All Grads Seniors
1986 College Seniors					
Total Group	777	48.2	$6,615	835	51.8
Sex:					
Male	377	48.8	$6,354	396	51.2
Female	400	47.6	$6,860	440	52.4
Race/Ethnicity:					
White	692	47.7	$6,675	760	52.2
Black	45	54.9	$5,896	37	45.1
Hispanic	21	56.8	$7,086	16	43.2
SES Quartile(s):					
Lowest	72	66.7	$5,927	36	33.3
Middle Two	371	56.6	$6,431	285	43.4
Highest	330	39.4	$6,943	507	60.6

Table 3

Undergraduate Debt and Gradute Education Aspirations of College Graduates in 1976 and 1984 and College Seniors in 1986

	1976	1984	1986
Weighted Sample N's	2,000	1,716	1,612
Percentage aspiring to graduate education	76.5%	54.2%	62.1%
Percentage with debt aspiring to graduate education	82.3%	54.7%	62.2%
Mean debt:			
Actual dollars	$2,777	$6,262	$6,615
1976 dollars	$2,777	$3,469	$3,486
Percentage without debt aspiring to graduate education	72.6%	50.8%	63.0%

Table 4

Undergraduate Debt and Graduate/Professional School Applications of College Graduates in 1976 and 1984 and College Seniors in 1986

	1976	1984	1986*
Weighted Sample N's	2,000	1,716	1,612
Percentage who applied to graduate/professional school	32.2%	25.3%	13.4%
Percentage with debt who applied to graduate/professional school	36.1%	26.6%	12.9%
Mean debt:			
Actual dollars	$2,882	$5,813	$6,612
1976 dollars	$2,882	$3,220	$3,485
Percentage without debt who applied to graduate/professional school	30.0%	22.0%	13.9%

*Number and percentages as of February 1986.

Table 5

Characteristics of College Graduates in 1976 and 1984 and College Seniors in 1986 Who Applied to Graduate/Professional School

	With Debt			Without Debt	
	Wtd. Sample N	% With Debt Who Applied	Mean Debt	Wtd. Sample N	% Without Debt Who Applied
1976 College Graduates					
Total Group	277	36.1	$2,882	369	30.0
Sex:					
Male	144	41.0	$2,874	208	35.1
Female	134	32.1	$2,890	161	25.2
Race/Ethnicity:					
White	218	33.4	$2,864	339	30.0
Black	36	48.6	$3,200	10	23.2
Hispanic	8	61.5	$3,863	5	55.6
SES Quartile(s):					
Lowest	38	33.0	$2,883	18	23.4
Middle Two	131	34.4	$3,256	98	23.1
Highest	108	38.8	$2,427	253	34.1
1984 College Graduates					
Total Group	271	26.6	$5,813	153	22.0
Sex:					
Male	117	25.2	$5,471	92	25.8
Female	154	27.7	$6,072	61	17.9
Race/Ethnicity:					
White	242	27.2	$5,931	136	22.3
Black	14	20.3	$3,866	6	14.0
Hispanic	5	22.7	$5,724	4	19.0
SES Quartile(s):					
Lowest	21	19.3	$3,220	11	23.4
Middle Two	105	23.4	$5,492	39	14.9
Highest	145	31.5	$6,435	103	27.3

Table 5 (cont'd)

Characteristics of College Graduates in 1976 and 1984 and College Seniors in 1986 Who Applied to Graduate/Professional School

	With Debt			Without Debt	
	Wtd. Sample N	% With Debt Who Applied	Mean Debt	Wtd. Sample N	% With/out Debt Who Applied
1986 College Seniors[1]					
Total Group	100	12.9	$6,612	116	13.9
Sex:					
Male	57	15.1	$6,278	70	17.7
Female	43	10.8	$7,057	47	10.7
Race/Ethnicity:					
White	87	12.6	$6,739	103	13.6
Black	15	15.6	$6,654	4	10.8
Hispanic	16	21.4	$5,331	1	6.3
SES Quartile(s):					
Lowest	8	5.6	$3,718	1	2.8
Middle Two	47	10.5	$7,173	30	10.5
Highest	70	17.0	$6,409	85	16.8

[1] Percentage of 1986 college seniors who had applied to graduate/professional school by February 1986.

Table 6

Mean Educational Debt of Applicants and Non-applicants to Graduate/Professional School, 1976, 1984, and 1986

	Mean Debt	
	Applicants	Non-applicants
College Graduates, 1976	(Wtd N=646)	(Wrd N=1354)
Total Group	$2,882	$2,631
Sex:		
Male	2,874	2,491
Female	2,890	2,727
Race/ethnicity:		
White	2,864	2,648
Black	3,200	2,589
Hispanic	3,863	1,866
SES Quartile(s):		
Lowest	2,883	2,549
Middle Two	3,256	2,775
Highest	2,427	2,463
College Graduates, 1984	(Wtd N=695)	(Wtd N-1021)
Total Group	$5,813	$6,008
Sex:		
Male	5,471	6,250
Female	6,072	5,800
Race/ethnicity:		
White	5,931	6,203
Black	3,866	4,345
Hispanic	5,724	5,286
SES Quartile(s):		
Lowest	3,220	4,627
Middle Two	5,492	5,919
Highest	6,435	6,491

Table 6 (cont'd)

Mean Educational Debt of Applicants and Non-applicants to Graduate/Professional School, 1976, 1984, and 1986

	Mean Debt	
	Applicants	Non-applicants
College Seniors, 1986[1]	(Wtd N-216)	(Wtd N-1396)
Total Group	$6,612	$6,638
Sex:		
Male	6,278	6,393
Female	7,057	6,858
Race/ethnicity:		
White	6,739	6,693
Black	6,654	5,708
Hispanic	5,331	6,053
SES Quartile(s):		
Lowest	3,718	6,027
Middle Two	7,173	6,374
Highest	6,409	7,076

[1] Percentage of 1986 college seniors who had applied to graduate/professional school by February 1986.

Table 7

Undergraduate Debt and Graduate/Professional School Attendance by College Graduates in 1976 and 1984

	1976	1984
Weighted Sample N's	2,000	1,716
Percentage of all college graduates attending graduate/ professional school	20.8%	11.1%
Percentage of college graduates with debt attending graduate/professional school	24.9%	12.2%
Mean debt:		
Actual dollars	$2,906	$5,966
1976 dollars	$2,906	$3,144
Percentage of college graduates without debt attending graduate/professional school	18.5%	9.3%

Table 8

Debt Status of College Graduates Enrolled in Graduate and Professional Schools, 1976 and 1984

	Graduate School	Professional School	Other or Unknown
Enrolled 1976 Graduates (Wtd N-416)			
Percentage of graduates enrolled	60.1%	25.5%	14.3%
Percentage of indebted graduates enrolled	63.9%	22.5%	15.2%
Mean debt:			
Actual dollars	$2,879	$3,356	$2,286
Percentage of graduates without debt enrolled	56.6%	28.1%	15.4%
Enrolled 1984 Graduates (WTD N-190)			
Percentage of students enrolled	63.5%	36.0%	0.5%
Percentage of indebted graduates enrolled	60.5%	38.7%	0.8%
Mean debt:			
Actual dollars	$5,662	$6,408	$7,500
1976 dollars	$3,137	$3,550	$4,155
Percentage of graduates without debt enrolled	70.8%	29.2%	0%

Table 9

Factors Related to Aspirations for Graduate/Professional Education

(Standardized Regression Weights)

	1976	1984	1986
Background	(Wtd N-2000)		
Sex - Male	.08***	.00	.01
Race - White	-.14***	-.12***	-.12***
Married	-.08***	-.03	.02
Family Income	.03	-.00	.07**
Parental Education	.03	.06*	.08***
HS Grades	-.01	.05*	.02
HS Tested Achievement	.06*	.11***	.09***
College			
College Grades	.22***	.29***	.19***
College Cost (Tuition and Fees)	.01	.16***	.13***
Debt Amount	.10***	.01	.03
Science Major	.11***	.03	.09***
R^2	.11	.18	.12

* - significant at the .05 level
** - significant at the .01 level
*** - significant at the .001 level

Table 10

Factors Related to Graduate/Professional School Application

(Standardized Regression Weights)

	1976	1984	1986+
Background	(Wtd N-2000)	(Wtd N-1716)	(Wtd N-1612)
Sex - Male	.09***	.05*	.05**
Race - White	-.09***	.03	.01
Married	-.04	-.02	-.00
Family Income	.03	.02	.01
Parental Education	.02	.06*	.06**
HS Grades	.06*	.03	.06*
HS Tested Achievement	.05*	-.04	-.07**
College			
College Grades	.15***	.10***	.14***
College Cost (Tuition and Fees)	.02	.05	.10***
Debt Amount	.02	-.04	-.03
Science Major	.10***	.06*	.06**
Educational Aspirations-Grade 16	.34***	.43***	.28***
R^2	.25	.26	.16

* - significant at the .05 level
** - significant at the .01 level
*** - significant at the .001 level

+The 1986 data were collected in February while these seniors were still in college; it is likely that other seniors applied after these data were obtained.

Table 11

Factors Related to Graduate Enrollment

(Standardized Regression Weights)

	College Graduates Accepted by Graduate/Professional School	
	1976	1984
	(Wtd N=416)	(Wtd N=190)
Background		
Sex - Male	.08	-.03
Race - White	.05	-.03
Married	-.11*	-.14*
Family Income	.07	-.01
Parental Education	-.03	-.02
HS Grades	-.00	-.03
HS Tested Achievement	.06	-.14
College		
College Grades	.02	-.01
Debt Amount	.02	.03
Science Major	-.03	-.06
College Cost (Tuition and Fees)	-.04	.09
Graduate/Professional School+		
Applied But Did Not Get Financial Aid	-.11**	-.00
Received Financial Aid	.07	.14*
R^2	.06	.09

* - significant at the .05 level
** - significant at the .01 level
*** - significant at the .001 level

+Contrast with graduates who neither applied for nor received financial aid for graduate/professional school.

Table 12

Factors Related to Affecting Graduate Education Persistence

	College Graduates Enrolled in Graduate/Professional School	
	1976	1984
	(Wtd N = 416)	(Wtd N=190)
Background		
Sex = Male	.15***	.07
Race = White	-.04	-.01
Married	-.08	.06
Family Income	.10*	-.01
Parental Education	-.03	-.01
HS Grades	.08	-.11
HS Tested Achievement	.01	.04
College		
College Grades	.15***	.10
Debt Amount	.00	.00
Science Major	.04	.05
College Cost (Tuition and Fees)	.04	.04
Graduate/Professional School		
Received Financial Aid	.09**	.02
R^2	.11	.04

** = significant at the .01 level
*** = significant at the .001 level

Table 13

Relationship between Undergraduate Debt Amount and Graduate Aspirations, Application, Enrollment, and Persistence--Whites and Minorities

(Standardized Regression Weights)

	1976 College Graduates		1984 College Graduates		1986 College Seniors	
	W	M	W	M	W	M
Wtd N's	1781	139	1516	155	1452	118
Aspirations	.09***	.24**	.00	.07	.03	-.03
Application	.02	.12	-.04	.01	-.04	.05
Enrollment	.01	.21	.02	.34**	-	-
Persistence	.08*	.23	.01	.12	-	-

Table 14

Relationship between Undergraduate Debt Amount and Graduate Education Aspirations, Application, Enrollment, and Persistence--Males and Females

(Standardized Regression Weights)

	1976 College Graduates		1984 College Graduates		1986 College Seniors	
	M	F	M	F	M	F
Wtd. N's	896	1076	820	896	773	840
Aspirations	.09**	.11***	.02	.00	.05	.01
Application	.04	.01	-.09**	.01	-.04	-.02
Enrollment	-.04	.08	-.01	.03	-	-
Persistence	.04	.12*	.07	-.07	-	-

* - significant at the .05 level
** - significant at the .01 level
*** - significant at the .001 level

Table 15

Factors Related to Professional (vs Graduate) School Enrollment

(Standardized Regression Weights)

	College Graduates Attending Grad/Prof School	
	1976	1984
Wtd N's	416	190
Background		
Sex - Male	.33***	.20**
Race - White	-.11	-.07
Married	-.08	-.04
Family Income	.07	.14
Parental Education	.12*	-.14
HS Grades	.02	.05
HS Tested Achievement	.03	.08
College		
College Grades	.28***	.15
Debt Amount	.11	.10
Science Major	-.07	-.16*
College Costs (Tuition and Fees)	-.10	.10
Graduate/Professional School[1]		
Applied For But Did Not Get Financial Aid	.05	-.08
Received Financial Aid	-.25***	.11
R^2	.25	.16

* - significant at the .05 level
** - significant at the .01 level
*** - significant at the .001 level

[1] Contrast with graduates who neither applied for nor received financial aid for graduate/professional school.

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